

CLAIMS

1) A process for pretreating a natural gas under pressure containing hydrocarbons, at least one of the acid compounds hydrogen sulfide and carbon dioxide, and water, wherein :

- 5 a) the natural gas is cooled to produce a liquid phase and a gas phase,
- b) the gas phase obtained in stage a) is contacted in a distillation column with a liquid phase obtained in stage c) to produce a gas phase and a liquid phase,
- c) the gas phase obtained in stage b) is cooled to produce a liquid phase and a gas phase.

10 2) A process as claimed in claim 1, wherein in stage c), the gas phase obtained in stage b) is cooled by means of a heat exchanger.

Sub A1 → ~~3) A process as claimed in any one of claims 1 and 2, wherein in stage c), the gas phase obtained in stage b) is cooled by means of an expander.~~

4) A process as claimed in claim 2, wherein :

15 d) the gas phase obtained in stage c) is cooled by means of an expander to produce a gas phase and a liquid phase that is recycled to stage b).

Sub A2 → ~~5) A process as claimed in any one of claims 3 and 4, wherein :~~

e) at least one of the gas phases obtained in stage c) and in stage d) is compressed by using the energy recovered from the expander.

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6) A process as claimed in any one of claims 1 and 2, wherein in stage c), the gas phase obtained in stage b) is cooled by means of a venturi neck, said liquid phase being discharged in the vicinity of the venturi neck and said gas phase being recovered at the outlet of the divergent tube of the venturi neck.

5 7) A process as claimed in claim 6, wherein in stage c), said liquid phase discharged in the vicinity of the venturi neck is cooled to produce the liquid recycled to stage b) and a gas phase.

Sub A3
10 8) A process as claimed in any one of the previous claims, wherein at least one of the gas phases obtained in stage c) and in stage d) is used to cool at least one of the gas phases obtained in stage a) and in stage b).

9) A process as claimed in any one of the previous claims, wherein :

f) at least part of the liquid phase obtained in stage b) is vaporized and said vaporized at least part of the liquid phase is fed into the distillation column so as to create an ascending vapour flow in said column.

15 10) A process as claimed in any one of the previous claims, wherein part of the heat of the liquid phase obtained in stage b) is used to heat the gas phase obtained in stage a).

20 11) A process as claimed in any one of the previous claims, wherein in stage a), the liquid phase and the gas phase are separated in a drum and at least part of the liquid phase obtained in stage b) is fed into said drum.

12) A process as claimed in any one of the previous claims, wherein the operating conditions are as follows :

- Distillation column in stage b)

$T^{\circ}\text{C} = -20^{\circ}\text{C}$ to 100°C ,

$P > 1$ MPa abs.

- Pressure and cooling temperature in stage c)

5 $T^{\circ}\text{C} = -100^{\circ}\text{C}$ to $+30^{\circ}\text{C}$,

$P > 1$ MPa,

- Temperature to which said natural gas is cooled in stage a)

0 to 50°C .

10 13) A process as claimed in any one of the previous claims, wherein the natural gas under pressure has a partial hydrogen sulfide pressure of at least 0.5 MPa.

14) A process as claimed in any one of the previous claims, wherein a distillation column having at least 3 theoretical stages is used.

15 15) A process as claimed in any one of the previous claims, wherein in stage a), the natural gas is at a pressure ranging between 6.5 MPa and 12 MPa, and at a temperature above 15°C .

16) A process as claimed in any one of the previous claims, wherein :

g) the liquid phases obtained in stages a) and b) are fed into a well.

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